CLAIMS

What is claimed is:

1. A method for mitigating sidelobe artifacts in a radiation patterning process, comprising:

defining elements to be formed in a radiation-patterning tool as a function of a wavelength of radiation to be used to create desired patterns and resultant sidelobes;

calculating a diffraction ring about each of said elements;

identifying at least one location where one diffraction ring from one of said elements intersects another diffraction ring from another of said elements;

forming at least one sidelobe inhibitor across said at least one location.

2. The method of claim 1 wherein a radius of said diffraction ring is about eight-tenths of said wavelength.

3. The method of claim 1 wherein said at least one sidelobe inhibitor has dimensions of about one-half said wavelength of said radiation.

4. The method of claim 1 wherein said at lest one location comprising a plurality of locations and wherein forming at least one sidelobe inhibitor comprises:

defining an overlap range extending around each of said locations;

defining a common location in lieu of each of said locations when a portion of an overlap range from one of said locations is common with a portion of an overlap range from another one of said locations; and

forming sidelobe inhibitors across at least a portion of said locations and said common locations.

5. The method of claim 1 wherein said radiation-patterning tool comprises a reticle.

6. The method of claim 1 wherein the radiation-patterning tool comprises a photomask.

7. A method of generating sidelobe inhibitors on a radiation-patterning tool, comprising:

defining elements to be formed in a radiation-patterning tool according to a defined wavelength of radiation intended to pass through said elements to create desired patterns and resultant sidelobes proximate to said desired patterns;

forming a mathematical description of said elements including spatial orientations therof;

defining a mathematical description of a diffraction ring about said mathematical description of said elements;

identifying mathematical descriptions of locations where one mathematical description of a diffraction ring of one of said elements intersects another mathematical description of a diffraction ring of another of said elements; and

forming sidelobe inhibitors across said radiation-patterning tool corresponding to at least one of said mathematical descriptions of locations.

8. The method of claim 7 wherein each of said mathematical descriptions of diffraction rings extends around a radius defined from a centroid of said mathematical description of one of said elements.

9. The method of claim 8 wherein a radius of said mathematical description of diffraction ring is about eight-tenths of said defined wavelength.

10. The method of claim 7 wherein said sidelobe inhibitors have dimensions of about one-half said wavelength of said radiation.

11. The method of claim 7 further comprising:

identifying proximity of a first one of said sidelobe inhibitors with at least one other of said sidelobe inhibitors; and

when one or more sidelobe inhibitors are identified as more proximate than a predefined threshold with respect to said first one of said sidelobe inhibitor, identifying a common sidelobe inhibitor in lieu of said first sidelobe inhibitor said one or more sidelobe inhibitors.

12. The method of claim 11 wherein the predefined threshold is about one-half of the defined wavelength to about one defined wavelength.

13. The method of claim 7 wherein said radiation-patterning tool comprises a reticle.

14. The method of claim 7 wherein the radiation-patterning tool comprises a photomask.

15. A method for designing a mask for illuminating a pattern, comprising:

defining elements to be formed in said mask;

calculating a diffraction ring about each of said elements, each said diffraction ring including a radius coinciding with a location of sidelobes from a wavelength of radiation to create said elements; and

forming a sidelobe inhibitor at at least one intersection where a diffraction ring from one element intersects a diffraction ring from another of said elements.

16. The method of claim 15 wherein said at least one intersection comprises a plurality of intersections and further comprising:

defining an overlap range extending around each of said intersections;

defining a common intersection in lieu of each of said intersections when a portion of an overlap range from one of said intersections is common with a portion of an overlap range from another one of said intersections; and

forming sidelobe inhibitors across at least a portion of said intersections and said common intersection.

17. The method of claim 15 wherein a radius of said diffraction ring is about eight-tenths of said wavelength.

18. The method of claim 15 wherein said sidelobe inhibitors have dimensions of about one-half said wavelength of said radiation.

19. A computer-readable media having computer-executable instructions thereon for determining the placement of sidelobe inhibitors relative to elements to be formed on a radiation-patterning tool, comprising:

calculating a diffraction ring surrounding each of a plurality of elements, said diffraction ring coinciding with an approximate location of a sidelobe corresponding to a wavelength of radiation of said radiation-patterning tool;

calculating an intersect of a first diffraction ring with others of said diffraction rings; and

identifying said intersect as a location to place one of said sidelobe inhibitors.

20. The computer-readable media of claim 19, wherein said identifying comprises:

identifying ones of intersects wherein placement of one sidelobe inhibiter results in an overlap with another one or more sidelobe inhibitors; and

identifying a common intersect in lieu of intersects resulting in overlap as a location to place one of said sidelobe inhibitors.

21. The computer-readable media of claim 19, wherein said calculating a diffraction ring includes calculating a diffraction ring having a radius of about eight-tenths of said wavelength.

22. The computer-readable media of claim 19, further including forming said sidelobe inhibitor to have dimensions of about one-half said wavelength of said radiation.

23. A mask for exposing a resist-covered wafer in a radiation-patterning process, comprising:

transmissive elements corresponding to features on said wafer to be exposed, said elements formed as a function of a wavelength of radiation to be used for exposing; and

one or more sidelobe inhibitors to suppress sidelobes of said wavelength of radiation, said sidelobe inhibitors arranged from a calculation of intersections of diffraction rings around each of said elements.

24. The mask of claim 23 wherein a radius of said diffraction ring is about eight-tenths of said wavelength.

25. The mask of claim 23 wherein said sidelobe inhibitors have dimensions of about one-half said wavelength of said radiation.

26. The mask of claim 23 wherein said one or more sidelobe inhibitors are further arranged to avoid overlap of a said sidelobe inhibitors and, when overlap is predicted to occur, two or more overlapping sidelobe inhibitors are merged into a single sidelobe inhibitor arranged central to said overlap of said sidelobe inhibitors.